

## Building a Global Manganese Business

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Supplying low-carbon sustainable manganese ore and EV battery grade HPMSM to global markets.

# Disclaimer

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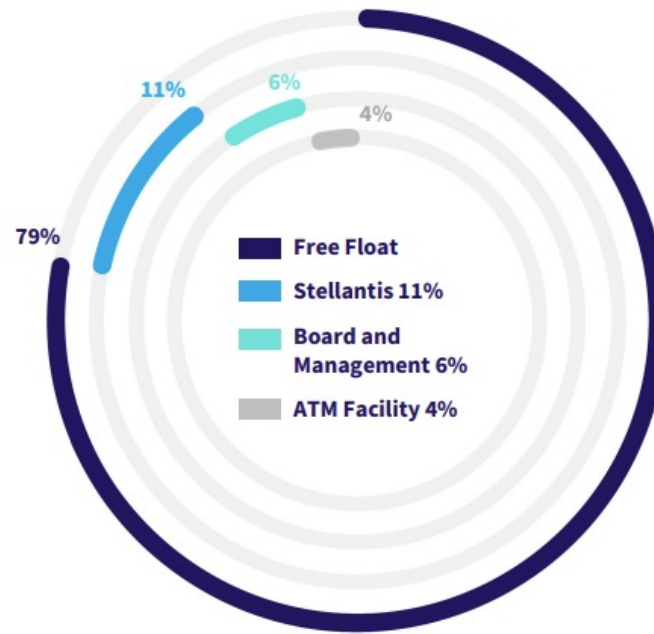
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Operating the 100% owned Butcherbird Manganese Mine in Western Australia to produce high-quality manganese oxide concentrate.

Building a USA-based refinery to supply ethical battery-grade High Purity Manganese Sulphate Monohydrate (HPMSM) products.

Offtake and funding agreements in place with our partners General Motors and Stellantis to supply HPMSM for Electric Vehicle batteries.

Share Register:



## BOARD OF DIRECTORS



John Ribbons  
Chairman  
CPA



Justin Brown  
Managing Director  
Geologist



Fanie van Jaarsveld  
Non-Executive Director  
Analytical Chemist



Sam Lancuba  
Non-Executive Director  
Chemical Engineer

Experienced,  
Multi-disciplinary Board &  
Management

## PROJECT DEVELOPMENT AND OPERATIONS TEAM



Michael Jordon  
Chief Financial Officer  
CPA



Neil Graham  
VP Battery Materials  
Chemical Engineer



Sias Jordaan  
VP Marketing & Logistics  
Accountant



Ian Huitson  
Study Manager  
Mining Engineer



Gideon van Wyk  
GM Manganese Ore Bus.  
Mechanical Engineer



Leon Lima  
Technology Manager  
Chemical Engineer



## Butcherbird Expansion

### 1.1 Mt Mn Ore

Build and commission a full commercial-scale processing facility at the 100% owned Butcherbird Manganese Mine.



## Louisiana HPMSM

### USA EV Critical Raw Materials

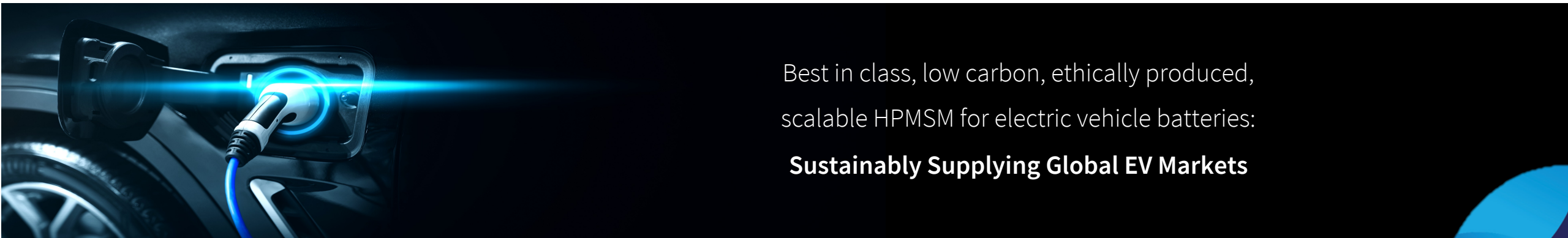
Construct the first US HPMSM processing facility (Louisiana), producing 65,000 tonnes per annum of battery-grade HPMSM.



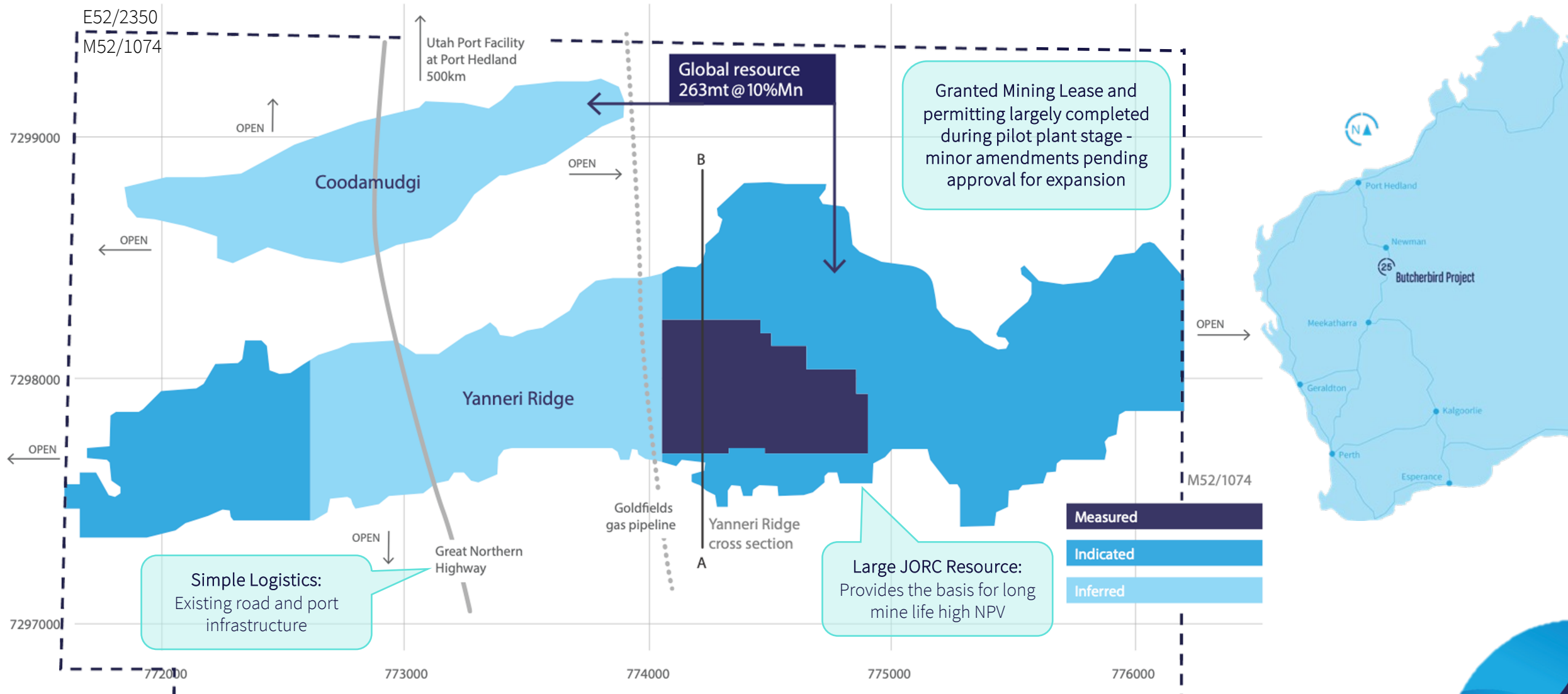
## Expand Globally

### HPMSM Expansion - EU & Asia

Multiple HPMSM modules globally to deliver sustainable HPMSM supply to global EV markets.

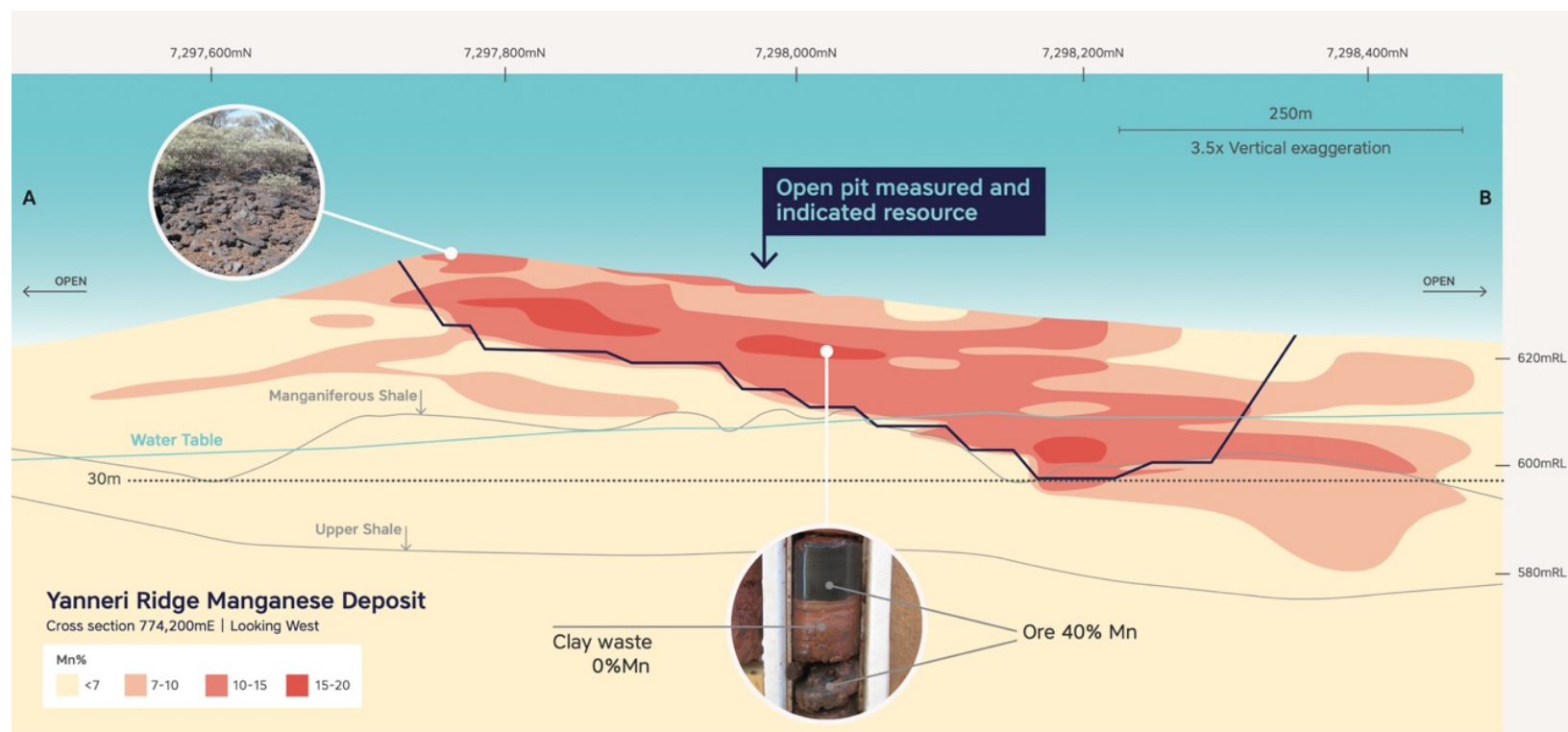


# Large, long-life manganese ore mine in Western Australia



# Simple geology means low-cost, low impact mining

Classification	Tonnes (Mt)	Mn (%)	Contained Mn (Mt)
Resource	260.9	9.9	20.8
Reserve	50.6	10.3	5.22



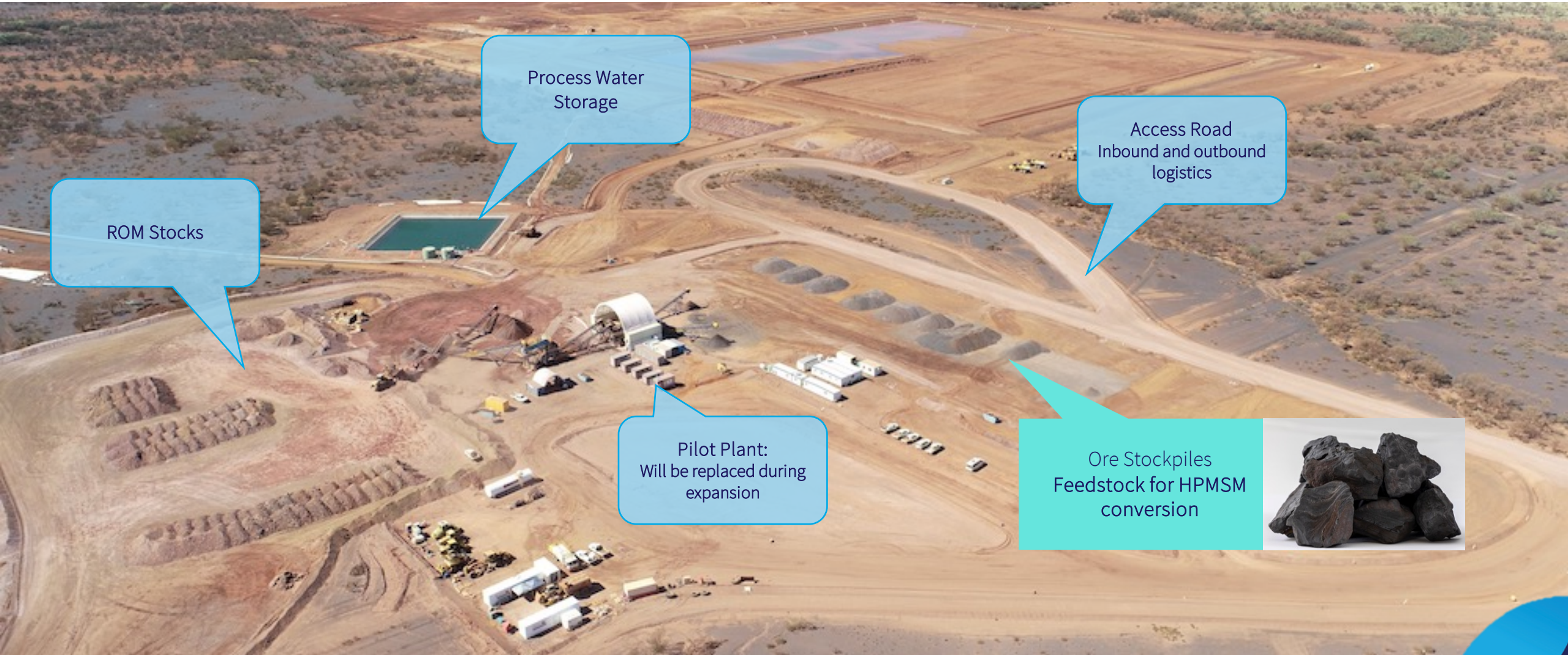
## RESOURCE GROWTH POTENTIAL

- Enough resource base for multi-decade long expansion pathway.
- Can produce concentrate, battery grade HPMSM and EMM without resource limitation.

## ENVIRONMENTALLY BENIGN OPERATION

- Ore from surface
- No explosives required
- No waste water
- One reagent – water
- Very low levels of contaminants





ROM Stocks

Process Water  
Storage

Access Road  
Inbound and outbound  
logistics






Pilot Plant:  
Will be replaced during  
expansion

Ore Stockpiles  
Feedstock for HPMSM  
conversion



# Butcherbird Expansion – low capital cost, robust economics...

- Butcherbird Expansion Feasibility Study  
Targets 1.1 Mtpa Manganese
- Production to Capture Economies of Scale  
with reduction in operating costs.
- Moves Element 25 down the global  
manganese ore cost curve.
- Negotiations underway with current offtake  
partners and other industry players.
- Demand for additional volumes robust.
- Approximately 12 months to deliver post FID.

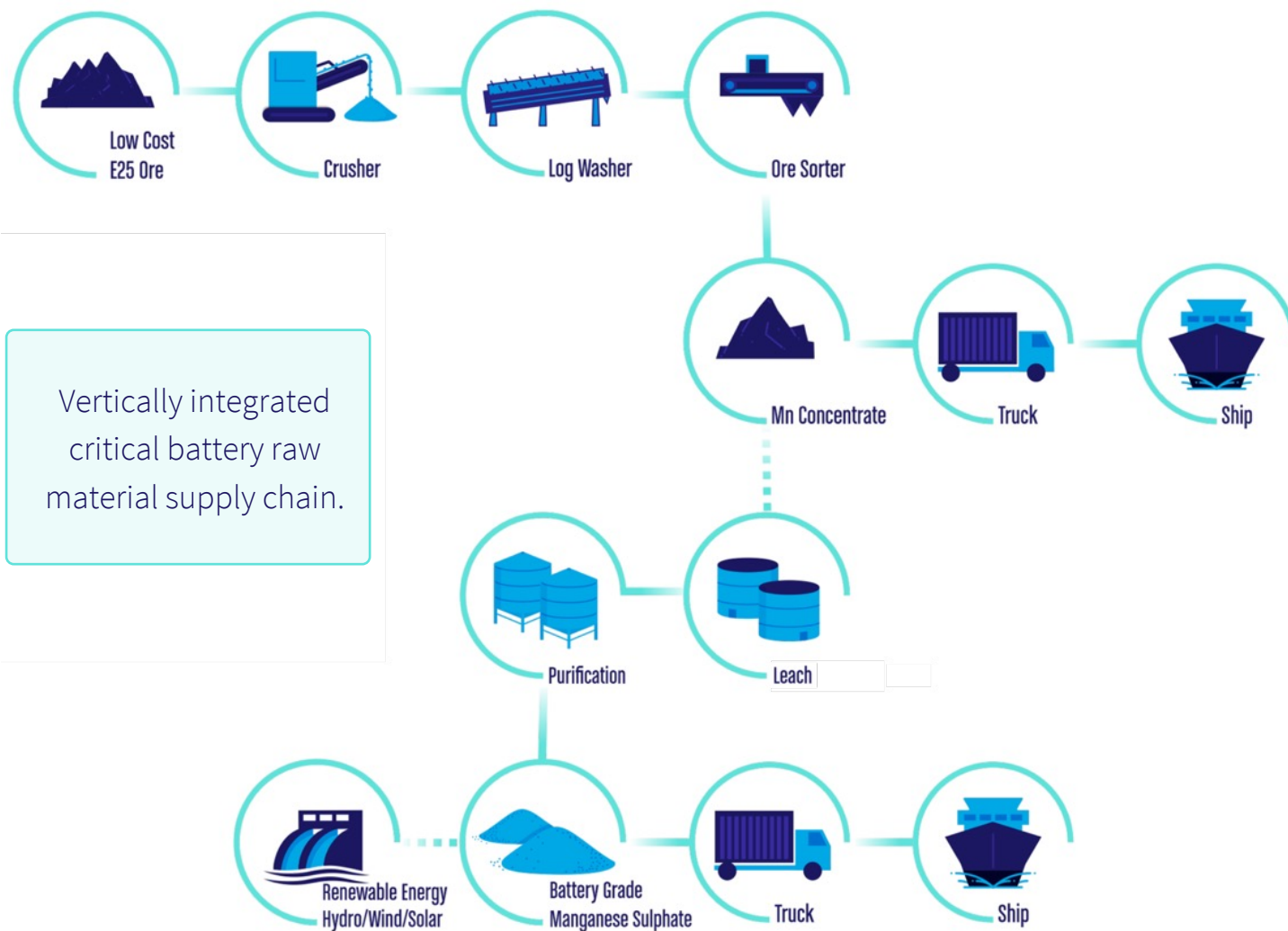
				
Capital Cost	NPV <sub>8</sub>	IRR	Cashflow	Payback
AU\$49.8	AU\$228M	113%	AU\$57.3M	1.2
(incl. contingency)	(Pre-tax, real)		(annual)	(years)

Key design outcomes from pilot plant and test work:





# Vertically-integrated global HPMSM supply



## Manganese Ore Supply:

Australian manganese ore concentrates as feedstock for HPMSM production to supply US EV markets. Surplus ore will supply existing ferroalloy customers.



## Louisiana HPMSM Refinery:

Louisiana manganese refinery will utilise the Australian ore as feedstock to produce high purity low carbon IRA compliant battery grade manganese sulfate.

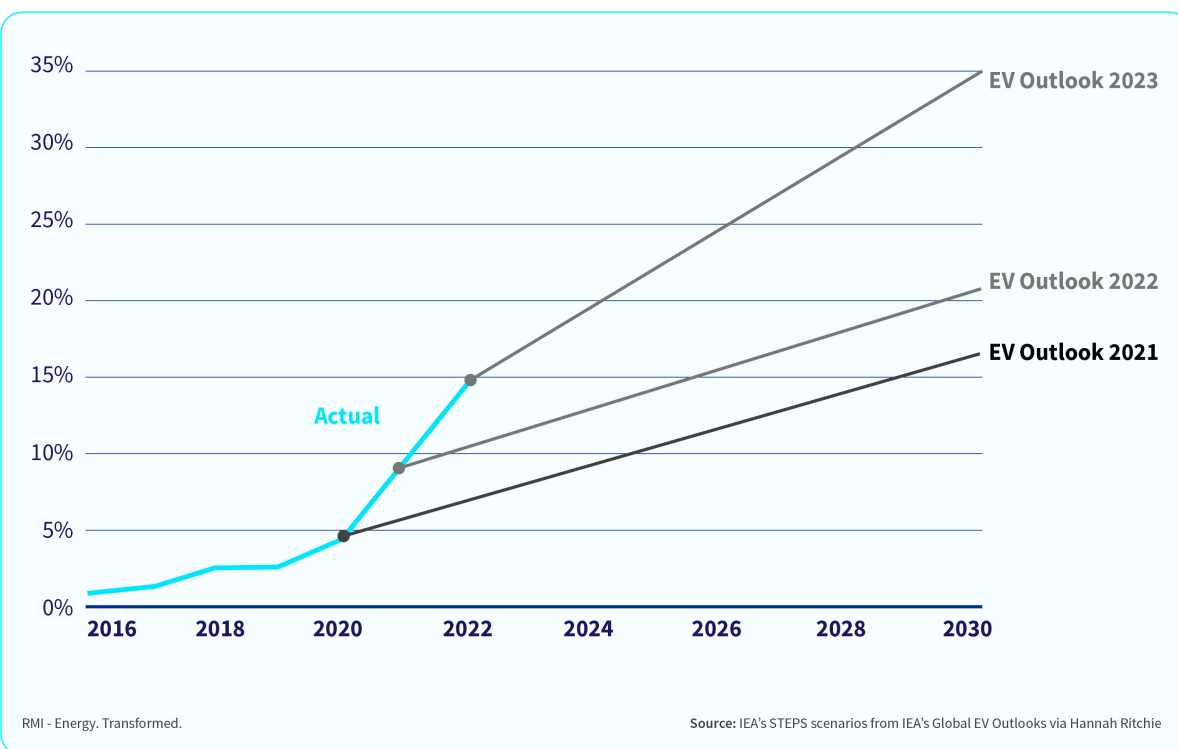




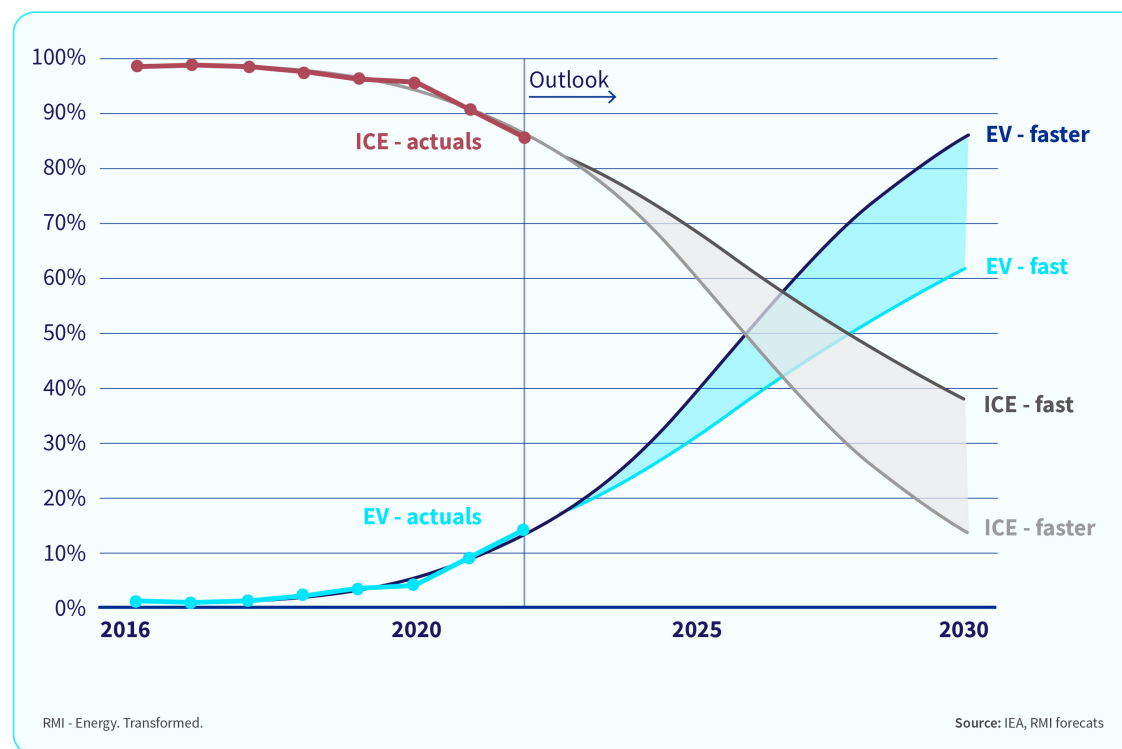
# Electric Vehicle (EV) uptake accelerating...

“...S-curve modelling, based on the EV growth so far and the lessons of other technology shifts, suggests EV sales will grow at least four-fold by 2030, and make up between 62 percent and 86 percent of global car sales in 2030...” RMI – Energy Transformed 2023

## EV sales forecast keeps being revised upwards



## Global EV and ICE market share forecast (%)



# Transition to Higher Manganese Cathodes

Manganese Rich Cathode chemistries help to solve supply, ESG and supply security challenges



High-manganese represents the optimum cost-benefit ratio.  
Volkswagen, March 2021

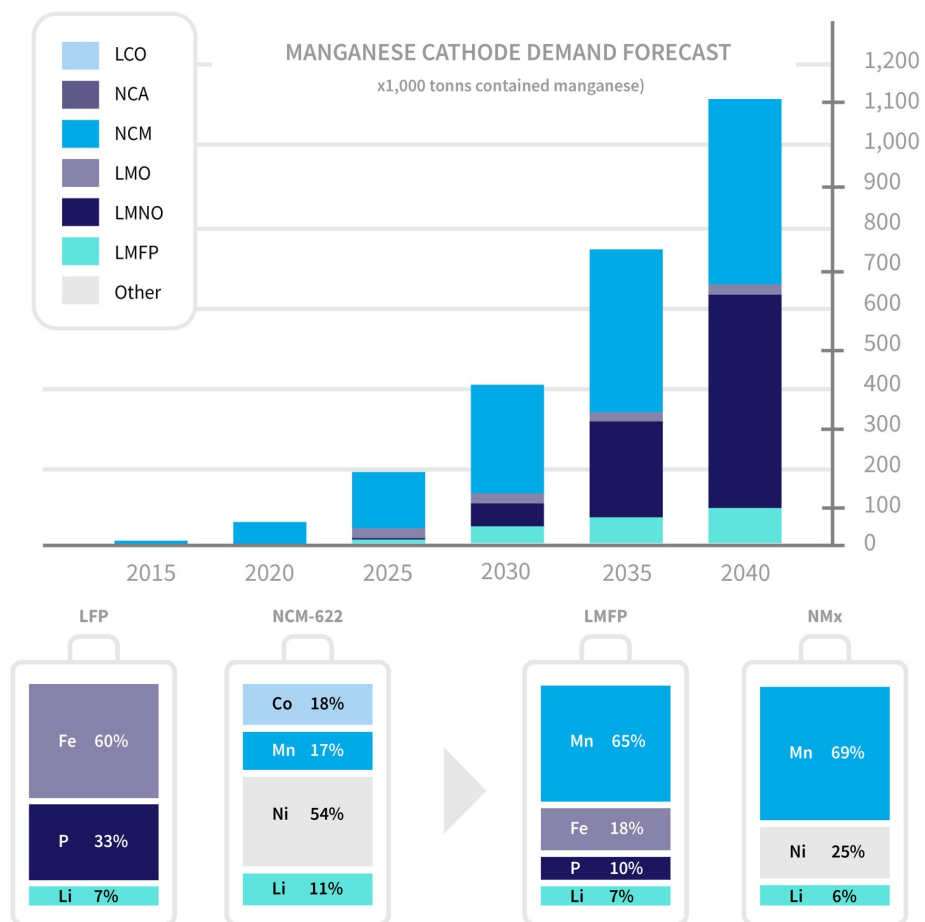


Li-Mn-rich technology shown as "cost" solution in electrification roadmap. BMW, November 2021



Tesla is working on new manganese battery cell.  
Tesla, March 2022

Reference: Umicore Capital Markets Day 2022



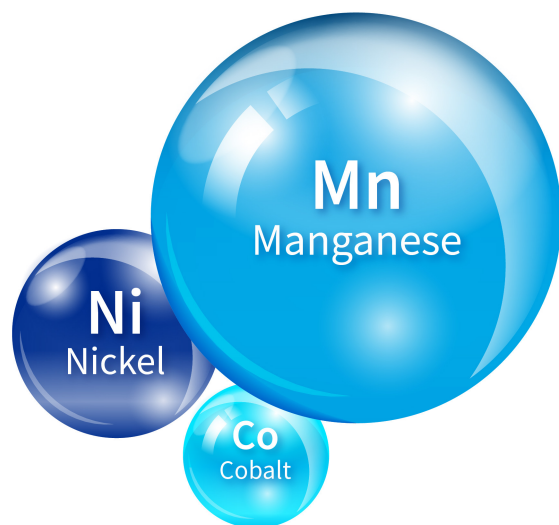
Reference: Benchmark Mineral Intelligence, South 32 Limited



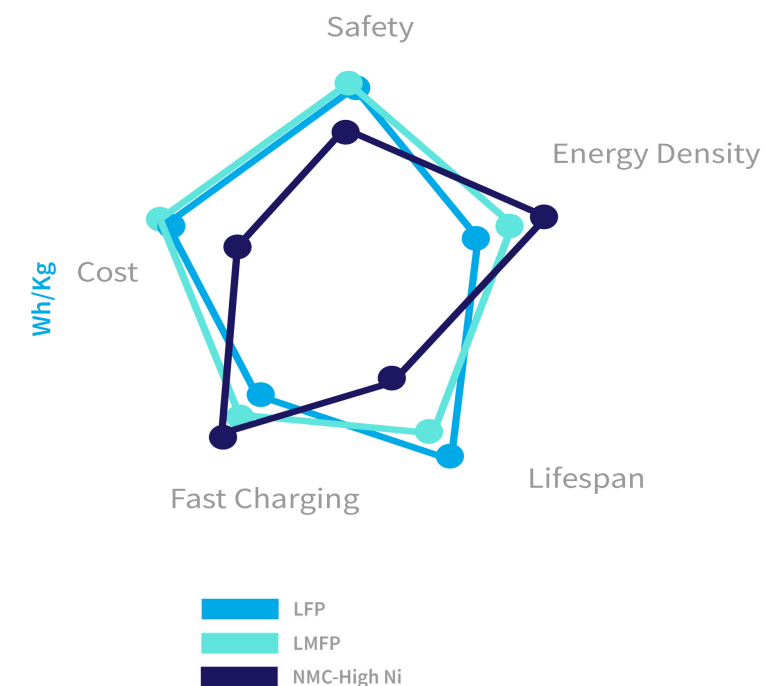
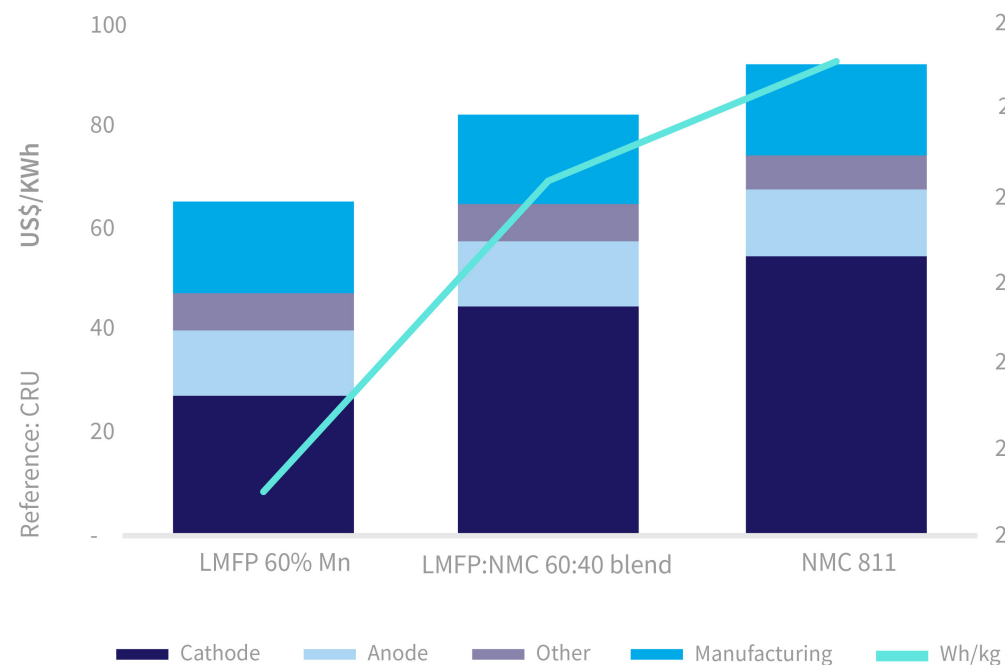
# Transition to Higher Manganese Cathodes

LMFP, LMNO and  $\text{NM}_x$  cathode chemistries offer improved safety, higher energy density, reduced cost per KWh and greater supply chain flexibility.

High Manganese Cathode Material offers a number of advantages:



Reduced nickel and very low to no cobalt content.



## PDAC 2023 Keynote Speaker

“...manganese (is) the single most critical mineral for batteries right now,” he said.

“How many companies outside of China make manganese commercially for a battery right now? Which is the hottest metal for batteries? How many? None, not one,” Hoffman said, adding “and there’s where the opportunity is — unbelievable.”

**“...manganese is the single most critical mineral for batteries right now...”**

Ken Hoffman, co-head of the EV battery materials research group and senior expert at McKinsey & Company

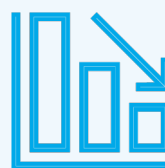




## Problems with Current Technologies:

- Large volumes of waste residues
- Toxic Reagents
- Inefficient
- Higher Cost
- Outdated processing technology

The Element 25 Process makes significant changes & improvements...



Reagents/Cost



Carbon Emissions



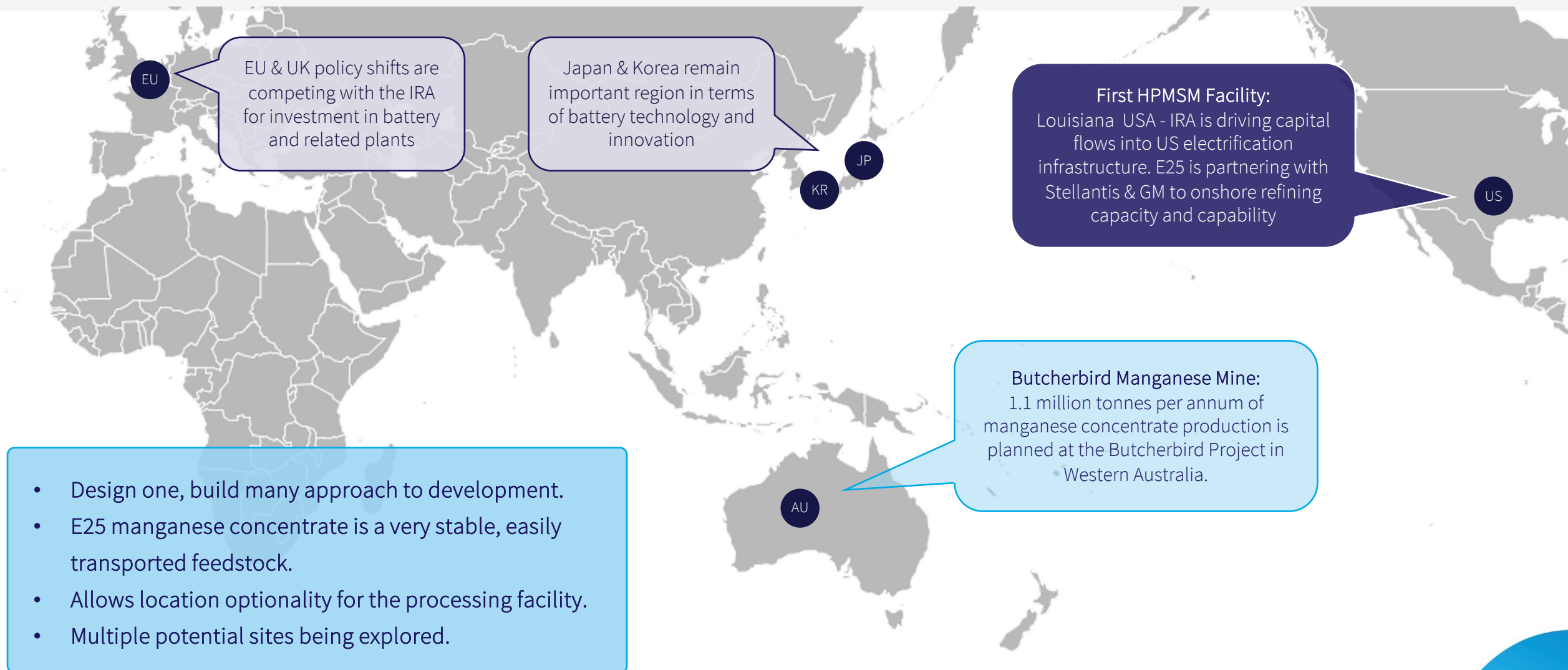
Waste Residue

## Element 25 Process

- More efficient (fast kinetics, reduced energy)
- Minimises reagent requirements
- Reduced carbon intensity
- Lower volumes of waste residues
- Non-toxic residues may be able to be repurposed.

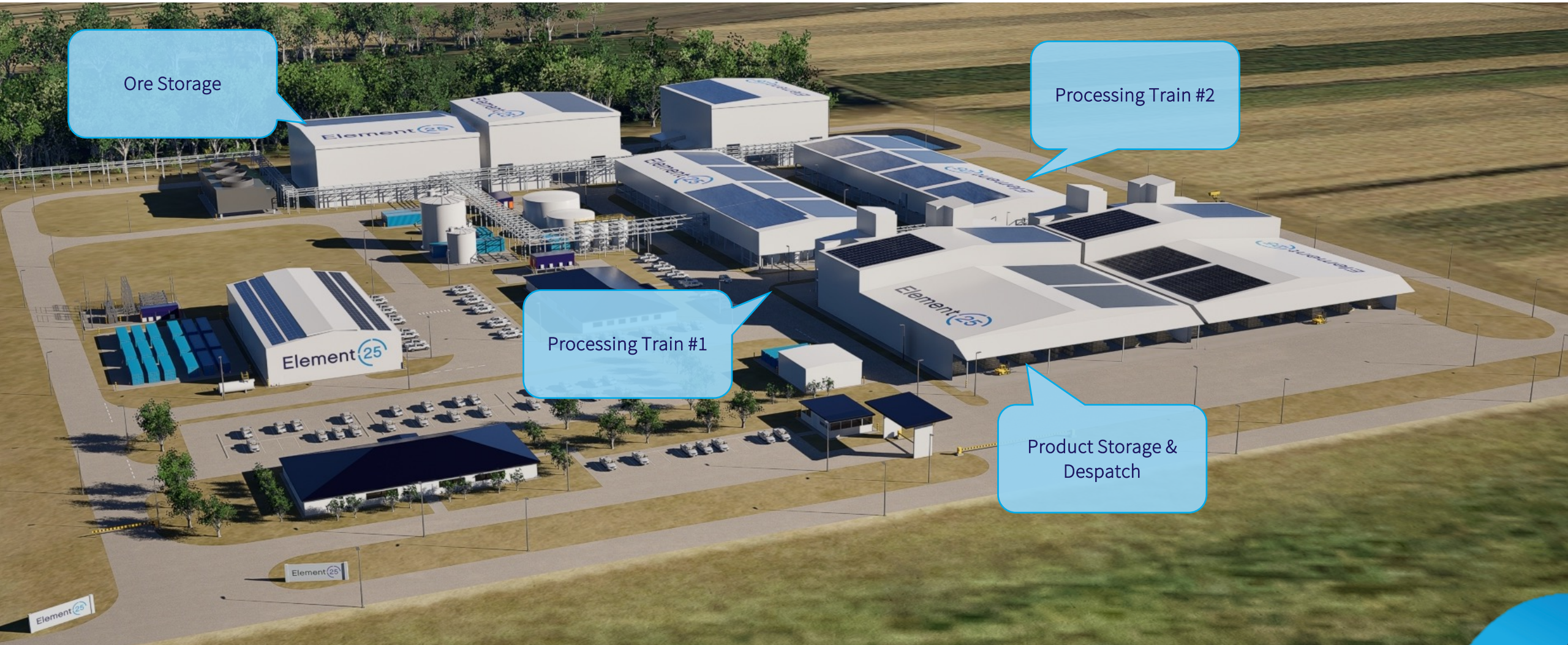


# Global Refining Capacity in the Longer Term





# Proposed Manganese Refinery





## Strong financial results underpinned by competitive capital and operating cost estimate



Cashflow

**US\$155M**

pre-tax average  
cashflow p.a. at  
full production  
(2 trains)



NPV

**US\$1,662M**

pre-tax (real)  
at full production  
Discount Rate 8%



IRR

**29%**

pre- tax at full  
production



Capital

**US\$289M**

for train 1 with an  
additional US\$187M  
required for train 2



HPMSM

**65,000 t/a**

expanding to  
130ktpa with a  
second train

## Maiden Ore Reserve

Category	Tonnes (Mt)	Mn (%)	Contained Mn (Mt)
Proved	14.4	11.5	1.65
Probable	36.2	9.8	3.56
Total	50.6	10.3	5.22

## Mineral Resource

Category	Tonnes (Mt)	Mn (%)	Si (%)	Fe (%)	Al (%)
Measured	14.1	11.4	20.6	11.7	5.7
Indicated	40.8	10.0	20.9	11.0	5.8
Inferred	206.0	9.8	20.8	11.4	5.9
Total	260.9	9.9	20.8	11.4	5.9

- 89% conversion of measured and indicated resources to reserve.
- Maiden Reserve only exploits approximately 20% of global mineral resource.
- Excellent potential for future expansion.
- More drilling has potential to add to global resource.

The information in this presentation that relates to Exploration Results is based on information compiled by Mr Justin Brown who is a full-time employee of the Company and is a member of the Australasian Institute of Mining and Metallurgy. Justin Brown has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Justin Brown consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The Company confirms that in the case of estimates of Mineral Resource or Ore Reserves, all material assumptions and technical parameters underpinning the estimates in the market announcement dated 29 September 2023 continue to apply and have not materially changed. The Company confirms that the form and context in which the competent person's findings are presented has not been materially modified from the original market announcement.

For further information on Element 25 Limited and its Projects please visit its website at [www.element25.com.au](http://www.element25.com.au) which contains copies of all continuous disclosure documents to ASX, Competent Persons' Statements and Corporate Governance Statement and Policies.

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